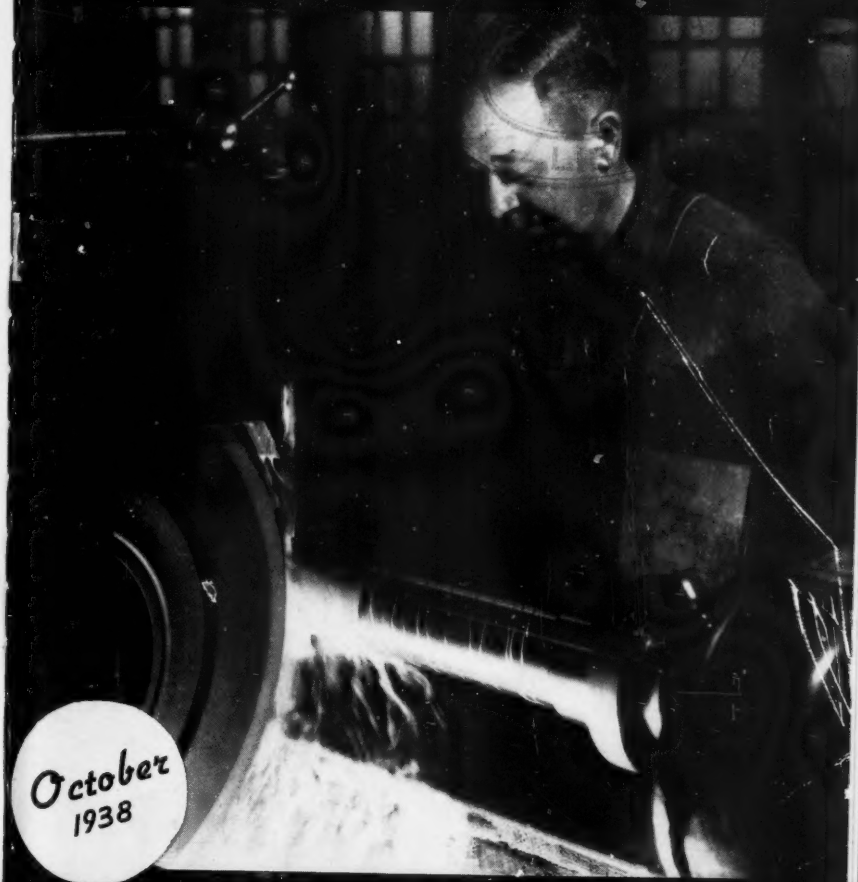
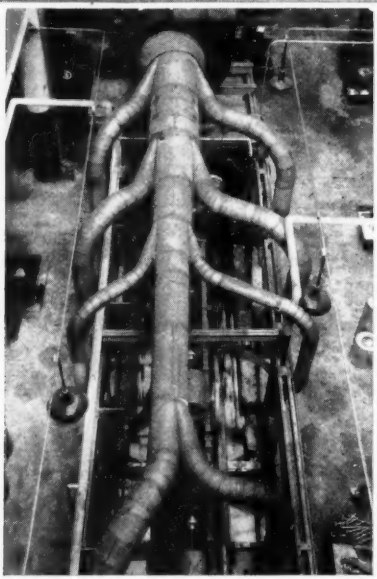
Occupational HAZARDS & SAFETY



October 1938

A NATIONAL MONTHLY FOR INDUSTRIAL MANAGEMENT

At the Chrysler Transmission Plant, Kokomo, Ind., nine K & B Systems remove dust from boring, milling, grinding operations. Illustration shows seven of the nine K & B "Cyclones" above the roof.



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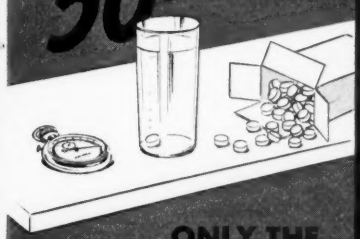

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Order at least one Morton Dispenser and a case of Morton Salt Tablets today. The cost is very small compared to the benefits derived.

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Early in July, under the auspices of the U. S. Public Health Service, convened leaders in every field of public and private medicine. The conference was known as the National Health Conference. The discussions were held in subject groups. It was at this convention that the question of socialized medicine was considered under the auspices of the Government.

Prior to this, there had been much talk on the subject in the councils of the American Medical Association, but never before had the Government gotten into it. This time Government stepped into the picture in the interests of Mr. Roosevelt's famous "one-third of the people," entitled to but unable to pay for medical treatment.

Significantly, one of the important discussion groups considered the question of industrial health. It was decided to ask Congress for an appropriation to make a national survey by industries of the entire subject. There is now no doubt that this will be done, with far reaching results. Management will have to like it, so management better get things in order.

●

"Scientific management condemns without reservations both child labor and sweatshop conditions; both are inefficient and clear evidence of poor

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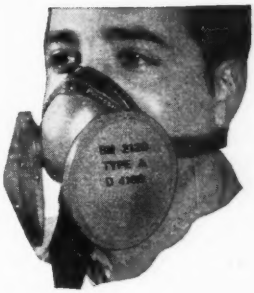

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management or antiquated social concepts. Similarly recognized is the necessity of healthful working conditions for employees, and the need for sick benefits and life insurance. With regard to these concepts, no backward step is possible. Likewise, modern management believes in provision for old-age pensions and unemployment relief. But the question may well be raised whether, under prevailing business conditions, employees and employers should assume the burden of creating, as the Social Security statute provides, a vast financial reserve for future contingencies over and beyond present needs; and whether these scheduled payments should not be revised to a pay-as-you-go basis."—Lewis H. Brown, Pres. Johns Manville Corp., at 7th International Management Congress.

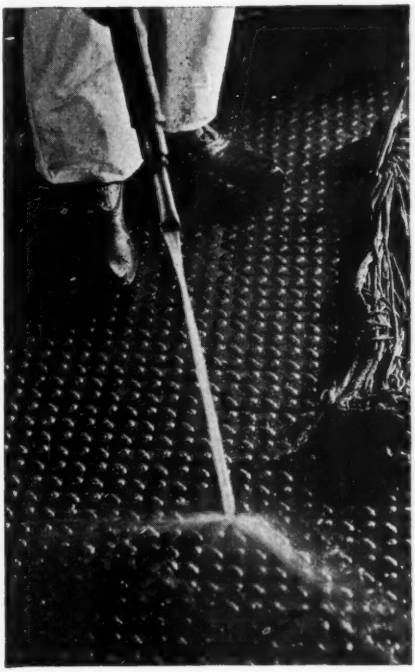
●

We in America have a peculiar way of doing things. Someone invents a Diesel engine and we have Diesel engineers. Someone else starts to weld and we have welding engineers. It is not unusual that in this age of specialization that we should have the industrial hygienist.

He is something of a newcomer to industry—a combination engineer, chemist, bio-chemist, pathologist, laboratory worker, and practitioner of prevention. He is the man who studies plant conditions and takes engineering steps to prevent illness among workers by using engineering methods for prevention. He studies fume concentrations, makes dust counts, etc.

There are enough of them now to form an association and consequently there is more than just talk about a forthcoming American Association of Industrial Hygienists.

ACCIDENTS WILL HAPPEN Where Floors Are SLIPPERY



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Multigrip is comfortable to work on, shoes won't catch in the tread.

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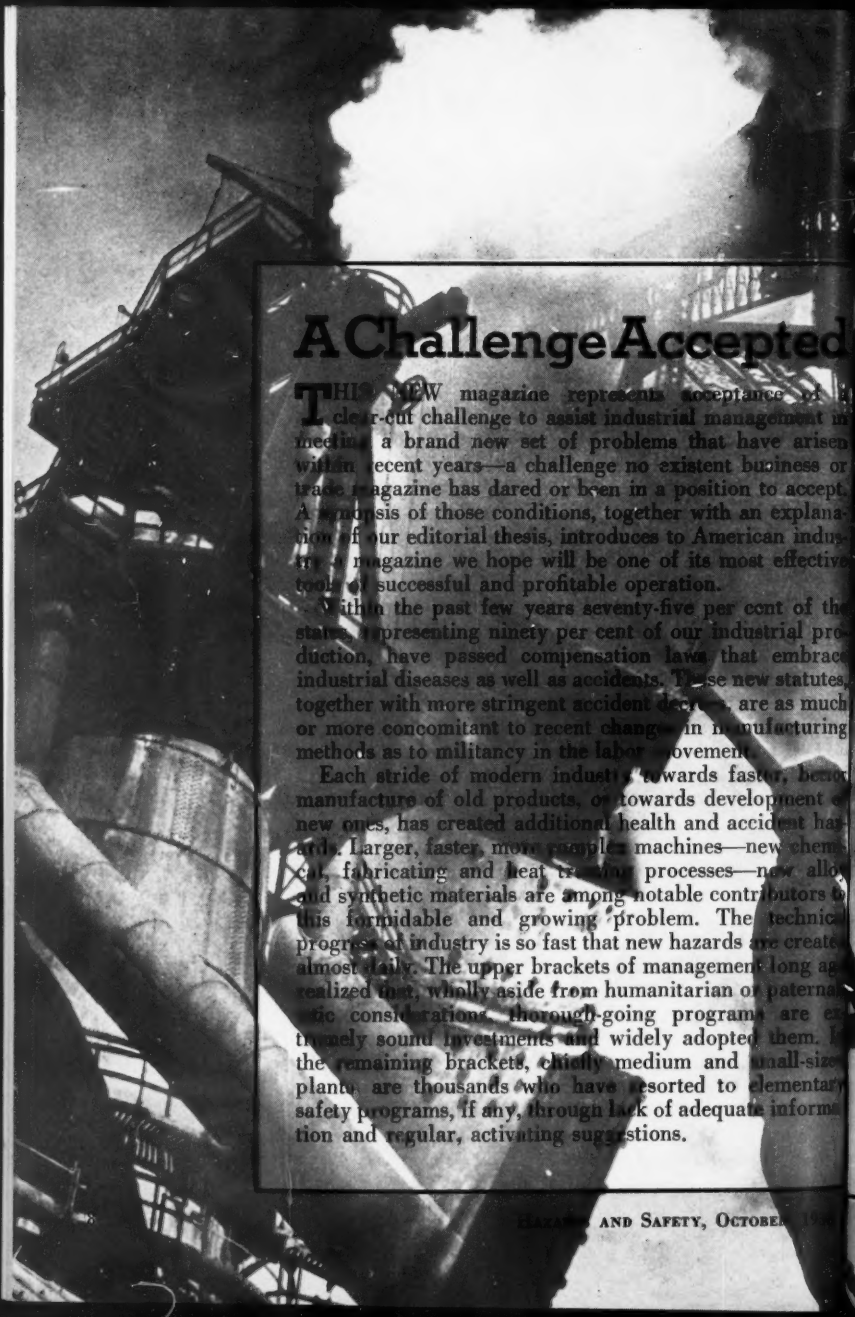


A Challenge Accepted

THIS NEW magazine represents acceptance of a clear-cut challenge to assist industrial management in meeting a brand new set of problems that have arisen within recent years—a challenge no existent business or trade magazine has dared or been in a position to accept. A synopsis of those conditions, together with an explanation of our editorial thesis, introduces to American industry a magazine we hope will be one of its most effective tools of successful and profitable operation.

Within the past few years seventy-five per cent of the states, representing ninety per cent of our industrial production, have passed compensation laws that embrace industrial diseases as well as accidents. These new statutes, together with more stringent accident decrees, are as much or more concomitant to recent changes in manufacturing methods as to militancy in the labor movement.

Each stride of modern industry, towards faster, better manufacture of old products, or towards development of new ones, has created additional health and accident hazards. Larger, faster, more complex machines—new chemical, fabricating and heat treating processes—new alloy and synthetic materials are among notable contributors to this formidable and growing problem. The technical progress of industry is so fast that new hazards are created almost daily. The upper brackets of management long ago realized that, wholly aside from humanitarian or paternalistic considerations, thorough-going programs are extremely sound investments and widely adopted them. In the remaining brackets, chiefly medium and small-size plants, are thousands who have resorted to elementary safety programs, if any, through lack of adequate information and regular, activating suggestions.

Whether of an advanced or elementary type, the average "safety" program today falls far short of its full objective. The popular connotation of safety is accident prevention. "A red light means danger. A green light means safe and clear. Don't touch exposed wires. Keep small wounds clean and covered. Watch the overhead crane. Wear your goggles, safety shoes, respirator," et cetera. Even when all such typical warnings have been driven home to the point of second-nature precautions, there is more, much more, to the problem.

With the exception of a handful of the largest companies, few have possessed the funds to employ safety engineers, bio-chemists, industrial physicians and other professional and technical health workers. Nor have many been able otherwise to obtain information for conducting integrated health and safety programs. Yet a man killed by silicosis is just as dead as one killed by a walking beam; a man laid up with oil dermatitis is just as much a drag on production as one recovering from a cut suffered in a drill press.

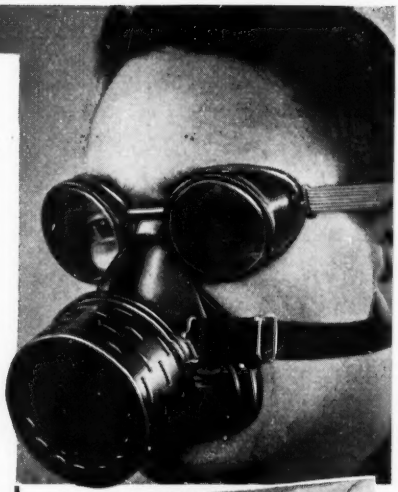
The growing responsibility of occupational hazards for lost time and impaired efficiency in industry, for excessive production costs and increased insurance and compensation rates, demands a brand new and broader concept of safety, by even long-term practitioners of safety programs in their ordinary connotation. Passage of the new compensation laws has given further emphasis to that demand and, at the same time, stirred the managements of many small and medium-sized plants to their first keen interest in safety programs at all.

From these facts OCCUPATIONAL HAZARDS AND SAFETY has sprung. This magazine will focus a spotlight on the subjects its name connotes—their nature, the liabilities they involve and the preventive measures possible through intelligent engineering and medical control. There will be no crucifying of industry, shouting of "wolf, wolf!", or stimulation of "fun-ny" ideas. Addressed to management executives and their duly appointed safety and personnel subordinates, OCCUPATIONAL HAZARDS AND SAFETY has as its theme "There's a Profit in Prevention," and to convince industry of that fact and to point the ways to it will be our constant effort.

Sterling B. Lester

PUBLISHER

New
AMERICAN R 1000 RESPIRATOR



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Occupational HAZARDS & SAFETY

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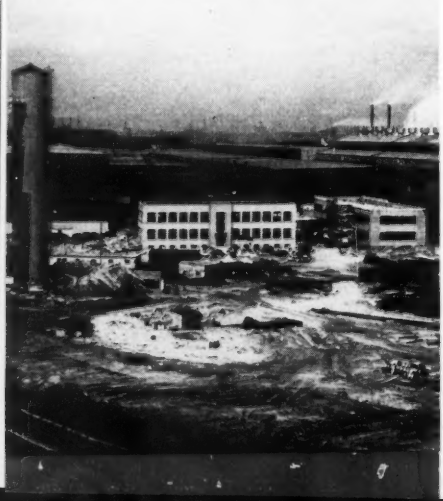
Something for Little Business

Big Business has progressed far along the road to plant safety. Little Business, to a great extent, has yet to start. The trip is a profitable one.

By KENNETH MORSE
Technical Adviser, Illinois Public Health Service

THE joint problem of occupational health and safety has grown tremendously in the past few years. Compensation payments and insurance rates have sharply risen. Occupational disease laws in particular have increased in number and their interpretation by compensation administrators is being made more and more liberal, particularly in those states having the "all-inclusive" laws. In some instances it has even been impossible to have occupational hazards covered by insurance companies. To add to all this, labor has made industrial health a major phase of their demands on management. It is very apparent that good industrial hygiene and safety are far beyond the paternalistic or humanitarian stage of industrial relations. They now loom as good economic measures.



Industry's interest in industrial hygiene has lagged in the past, not so much in our large plants, but in our small plants where management is not of the same foresight and, therefore, has not realized that an unhealthy worker is an inefficient and dissatisfied worker. To those who are well acquainted with the intelligence, ingenuity and progressiveness of American Industry, this may be difficult to understand. While resorting to these qualities to solve its sales, financial, production, and engineering problems, industry has not expended them towards the solution of its occupational hazards problem from a preventive standpoint. The environmental condition of the industrial worker is unquestionably better today than twenty years ago, largely due to the large manufacturer who has realized the economics of the problem, but his attitude has by no means solved the problem. It rests to a large extent with the small manufacturer.

Several factors are responsible for the small industrialist's apathy towards the question, chief of which are:

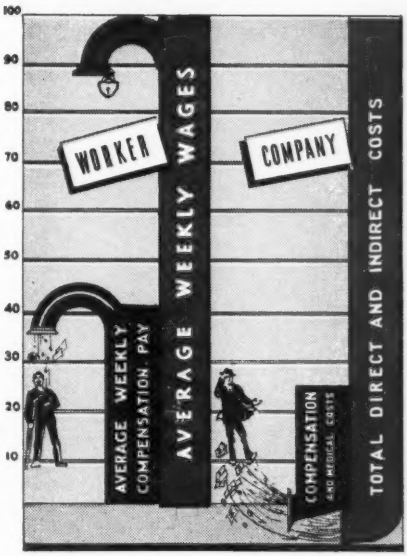
1. Lack of true understanding of industrial hygiene.

The "hidden costs" of accidents and disease are those which take the heaviest toll.

2. Conflicting medical and engineering information.
3. Impracticalness of remedial measures until recent times.
4. Apparently healthy workers.
5. Fear of labor unrest and flood of compensation claims.

To the small manufacturer business means things that are as visual as a machine in operation; and the manipulation of these visual elements for profit. To speak to him about indirect costs; the value of an industrial relations program; and the increased efficiency brought about through a healthier worker, is often beyond his realm of practicalities. When an accident occurs, he can see the result, but the slow absorption of toxic materials producing chronic poisoning over a period of years is beyond his comprehension, particularly if explained to him in highly technical language. The problem must be explained in clear, simple language and this has been neglected in the past.

Because of the gradual onset of many occupational diseases and their imperceptible physiologic changes from day to day, there is nothing startling to him in the gradual loss of power in the hands of a leaded worker, nothing particularly surprising in peculiarities of workers exposed to some solvents, nothing particularly



evident in the gradually developing lung changes and disability in those workers exposed to some dusts, and many other slow-working forces.

It is surprising to find the confused opinions of manufacturers as to what is meant by occupational diseases. In a great many cases their answer is "silicosis," and immediately the statement is made that since they haven't any dust liberating processes they haven't worried about health hazards. The chief cause of these confused opinions has been due to the publicized silicosis situation. Managers and presidents have seen article after article on the silicosis problem because of its particularly big and dramatic character. They have seldom paid much attention to the larger phases of industrial health, due in

some measures to industry only paying attention to the problem at the "result end," when the economic significance becomes a reality. That is, when a worker breaks down and a compensation case must be paid.

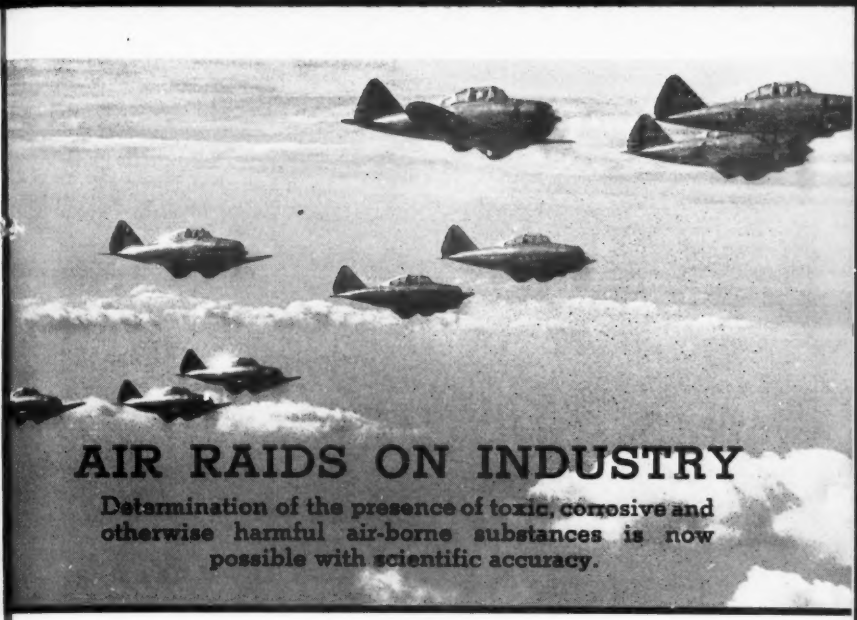
IN industrial hygiene, the science of maintaining good industrial health, silicosis is but a big pebble on the beach. In its broad aspect, industrial hygiene includes such factors as poisons, dusts, gases, abnormal temperatures and humidities, illumination, noises, asphyxiants, ventilation, communicable diseases, fatigue, sanitation, overcrowding, medical and nursing facilities, mental and personal hygiene.

Industry's belief that medical and engineering information on occupational diseases has been highly controversial or lacking was, in the past, correct. One had only to listen to such testimony given in compensation courts to realize the truth of this statement. But a good deal of this contradictory information was due to both labor and industry's willingness to accept the testimony of unqualified "experts." However, today definite information and accurate interpretation of findings are available through recognized authorities. The effect on health of a great many of the hazardous materials and processes is known. Precise methods have been developed by which exposure to these materials can be measured to determine whether the degree of exposure represents a safe level or a hazard. And there are equally precise methods by which such exposure can be controlled.

In the defense of industry, it can be said that a great number of the preventive and remedial measures for both health and safety matters advocated in the past have been suggested with little thought of their practicality, with inadequate understanding of the conditions involved. "I have men who have worked twenty years at that job and they haven't been sick a day." This is one of the most difficult situations to explain to an employer, not because it defies explanation but because the understanding of the explanation by one not a student of the subject is difficult.

Labor Unrest and Compensation Claims

Two of the main reasons for the stasis in these fields are the present labor situation and the fear of a greater flood of compensation claims. Industry is being extremely careful at present in attempting to maintain satisfactory labor relations. Fear that moves it may make in the field of occupational disease prevention may be the start of a new labor unrest, particularly if physical examinations are included, has been responsible for the slow action. Such an attitude is unwarranted, as labor unions already are almost as well aware of occupational disease as of accident injury hazards, and in many instances the prevention of these diseases has been one of labor's demands to management in collective bargaining proceedings. Through Federal and State labor departments, unions are being made still more aware of occupational diseases. It would be wise of management to forestall exhorbitant demands in this direction by taking voluntary steps of reasonable character now.



AIR RAIDS ON INDUSTRY

Determination of the presence of toxic, corrosive and otherwise harmful air-borne substances is now possible with scientific accuracy.

By WILLIAM P. YANT

Director of Research and Development
Mine Safety Appliances Company

THE substances that may be found in the air are, for the purpose of distinction, classified as gases, vapors, dusts, fumes, and mists. Briefly, gases are the substances that exist wholly in a gaseous form in their commonly known free state. Examples are oxygen, hydrogen, and ammonia. Vapors are the gaseous part of substances that are liquids in their commonly known free state. Examples are gasoline, benzol, and carbon tetrachloride. Dusts, from an industrial hygiene viewpoint, are small particles of solid material produced by mechanical operations such as grinding, screening, and drilling. The particles may range in size from those that are invisible to small grains of sand. Fumes are the solid particles produced by processes such as burning of metals or other compounds that produce a solid smoke-like material in the process of combustion. The smoke produced in burning lead or the zinc coating on metal are typical metal fumes. Fume particles are ordinarily of a much smaller size than dusts. Mists are air-carried particles or droplets of liquid materials. The range of size of the particles is similar to dusts. They are formed by atomizing, splashing, etc.

One needs only to consider the multitude of aerial enemies in indus-

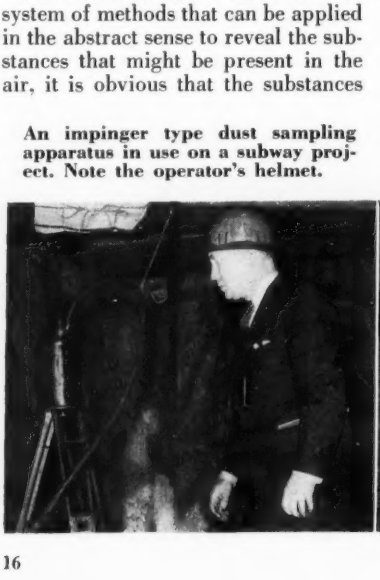
try to realize the variety of situations that must be met by methods for collecting and determining air-carried matter. The possibilities are further amplified by the facts that many substances can occur in several of the different forms and that a different procedure may be required for each form.

This brief reference to the scope of the problem and the variety of solutions that may be required is given not for the purpose of exaggerating the complexity of the problems but to indicate that "handy reference book" and "stereotyped" forms of instructions are scarcely adequate. The losses imposed on labor, management and capital alike by toxic, corrosive, abrasive and other air-borne particles is so great, however, that almost any intelligent attack is a profitable one.

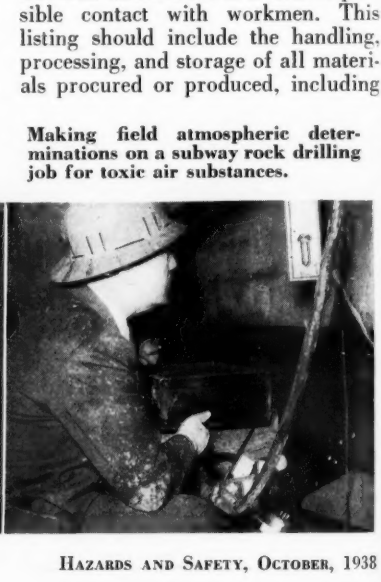
As there is no universal method or system of methods that can be applied in the abstract sense to reveal the substances that might be present in the air, it is obvious that the substances to be determined must either be known, suspected, or arbitrarily selected. For rather slow-changing industries and operations such as mining, tunneling, quarrying and the production of oil and gas, the substances that might be in the air are known and the equipment necessary for determining them is more or less standardized. With other industries, such as the chemical industries or those using chemical products, there is no end to the variety of substances that may be present now or later.

The most practical procedure for revealing the poisonous substances that may be in the air of a particular industry or plant is to make a list of all materials dealt with and then follow each harmful material through all processes and operating procedures in which there is actual or possible contact with workmen. This listing should include the handling, processing, and storage of all materials procured or produced, including

An impinger type dust sampling apparatus in use on a subway project. Note the operator's helmet.



Making field atmospheric determinations on a subway rock drilling job for toxic air substances.



those produced as intermediate products and waste products. It should be kept up to date through order of management to the effect that consideration of potential exposure of workmen be given to any change in the materials, processes, or duties.

There is another way in which the poisonous substances in the air are all too frequently indicated—namely, by breakdowns in the health of workmen and their filing of compensation claims. Anticipation of the dangers and a planned program of prevention would save many a company thousands of dollars a year on direct and indirect losses they now sustain from "industrial air raids."

There has been marked progress during the past few years in the development of methods that have the portability, convenience, and accuracy required for the control of occupational exposure. These developments and improvements have greatly facilitated the making of investigations, extended their scope, and markedly decreased the time and the cost. In addition to the development of methods that were to a considerable extent intended for the convenience and use of the industrial hygienist, considerable progress has been made in meeting the need for detecting instruments that can be used by plant supervisory personnel, or even by the workmen themselves, it being fully realized that these are the persons that must play the important part in the control of occupational exposure. These methods are needed for becoming acquainted with the quality of the air breathed and for the intelligent operation of control measures, such as general ventilation, exhaust hoods and respiratory protection of various types.

Stone cutter protected from rock dust by respirator.

Toxic fumes arising from a metal pickling operation.

A good deal has already been accomplished toward meeting the needs for control instruments. There are instruments for the detection of hydrogen sulfide, hydrocyanic acid, and carbon monoxide, that require only the squeezing of a rubber bulb and the observation of the change in color in a small tube of granular chemicals to measure the amount of these gases that are present. There are other indicators for carbon monoxide and also for hydrocarbons such as gasoline or benzol that automatically give direct indications of the amount of the gas or vapor in the air by the movement of a pointer on a dial. For the control of dust exposure, there are small instruments with which anyone can immediately make observations.

THERE are devices for carbon monoxide and hydrocarbons that can be installed in any place where these substances may occur in the air, and if the amount exceeds a predetermined value, the device will automatically ring a bell, light a lamp, operate ventilation and process equipment or make a continuous written record of the amount of gas present. Carbon monoxide recorders are continuously in use in every important vehicular tunnel of the world for recording and controlling the carbon monoxide in the atmosphere and safeguarding the public. Recording instruments have been developed for low concentrations of sulfur dioxide, carbon dioxide, hydrogen sulfide, oxygen, and are possible for other gases and vapors. Likewise, considerable work has been done on the development of automatic dust recorders.

In considering a method, its accuracy and limitations are matters of importance that should be given consideration from the viewpoint of the purpose of the determinations. For precise investigation and research, a high accuracy may be required, but for routine examinations of the air for control purposes, a lower accuracy is satisfactory, especially if it permits more convenience and ease in making the determinations. In these considerations the important points to recognize are not only the limitation of the method but also the limitations of the information given by the sample no matter how precisely it is determined and, further, the limitations of knowledge on the response of workers to various amounts of toxics.

Securing a sample of the atmosphere to be examined that is representative of the air breathed is the most difficult part of the determination of constituents in the air. It must always be remembered that the sample obtained represents only a portion of the air that was present at the point of sampling at the particular time during which the sample is taken. Depending on the process and cycle of operation, the amount of a contaminating agent may vary widely within a few minutes. As little as a few inches difference in the position of the worker's nose in relation to the source of the contaminant may in the extreme change the amount breathed from practically none to a very serious amount. There may be definite seasonal variations, owing to seasonal demand for products, to the influence of temperature conditions on the amount of contaminating agent liberated into the air or to the effect of

[*Please turn to page 46*]

Two Out of Every Three Health Compensation Checks—

go to pay the claims of dermatoses victims. This occupational disease claims more industrial workers than any several others combined.

By Louis Schwartz, M.D.
Medical Director, U. S. Public Health Service

WITH the advent of compensation legislation in the United States, more attention was given to occupational diseases and with them to occupational dermatoses. When the United States Public Health Service, in 1928, decided to make studies in occupational dermatoses, some of the states had already gathered statistics concerning their frequency of occurrence and had made compensation laws concerning them.

At the present time in the United States, 25 states compensate for industrial dermatoses. The laws in these states vary considerably. Fifteen of them take in all occupational dermatoses, or at least occurring in the principal industries in those states. The others have laws which limit the dermatoses to those cases due to certain listed substances.

Altogether, it is estimated that industrial dermatitis constitutes more than 65% of all occupational disease cases reported in the United States and from available records it is estimated that there are about 20,000 cases of industrial dermatitis with sufficient severity to lose time from work occurring in the United States. Actually there are many times this number because a large majority of cases of industrial dermatitis do not lose time from work and are not reported even though they may be treated by the plant physician or by the insurance company doctors.

From our own examinations of many cases of workers in various industries, we can conservatively say that more than 1% of the workers engaged in

basic industry suffer some time during the year with an occupational dermatitis. Taking into account the fact that there are about 25 million workers engaged in industry, this would give a conservative estimate of about 250 thousand cases of occupational dermatoses a year in the United States.

Compensation Averages $100

From available records of the compensation boards of the different states, it is estimated that the average case of industrial dermatitis receives a compensation of about $100, and that the average cost of medical care per case is also about $100, so that an estimate of $4,000,000 as the annual cost of occupational dermatoses in the United States is conservative.

It can be stated in general that the majority of occupational skin diseases reported in the United States are caused by alkalis, oils, solvents, dyes, and poisonous plants and acids.

All individuals are not susceptible to the same degree to skin irritants. The anatomical structure and the physiologic secretions of the skin are factors in susceptibility to external irritants. The defense mechanism of the skin against external irritants consists of the cornified cells of the outermost layer of the skin and the secretions of the glands of the skin.

The vulnerable portions of the skin are the openings of ducts and hair follicles through which certain chemical compounds, especially those which are fat soluble, may easily enter. Thinning or breaks in the cornified layer of the epithelium also act as portals of entry for external irritants.

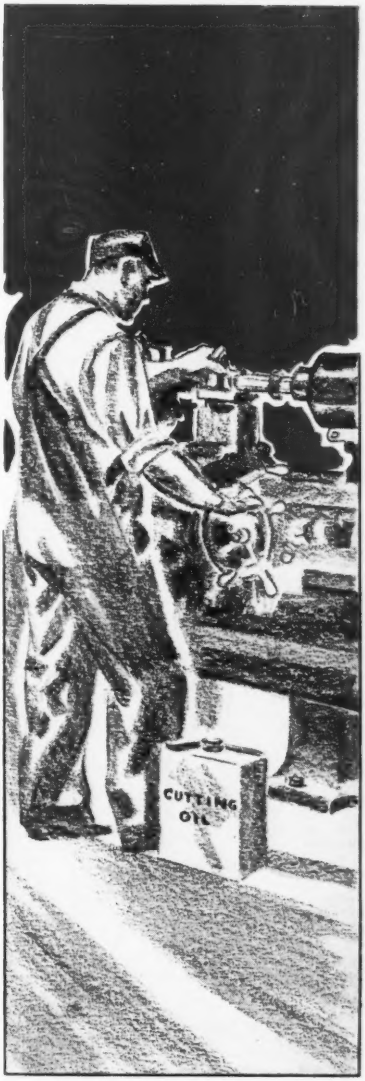
In so far as the characteristic tex-

A dermatitis infection, in exfoliative stage, in a rubber worker. Caused by an accelerator intermediate called Nitro-Captax.

Toxicodermatitis in a chemical worker due to di ... chlor benzol, an intermediate used in manufacture of sulphur black.

ture of the skin and the complexion affect the defense mechanism of the skin, it may be said that race plays a part in predisposition to sensitivity to external irritants. Blondes and thin-skinned individuals are more susceptible to certain irritants than those with darker, thicker and more oily skins. For this reason, many chemical factories will employ only Negro labor for certain jobs in which irritants are handled—as for instance, workers on filter presses, driers and grinders in synthetic dye manufacture. Workers having greasy, oily, thick skins withstand the action of such solvents as soaps, turpentine, naphtha, etc., better than do those with dry skins. On the other hand, in occupations where oils, greases or waxes are apt to soil the clothing, as for instance in oil refineries, machine shops and garages, those persons who have much hair on the arms and legs and who have excessive sebaceous secretions are more likely to develop acne-like lesions and folliculitis. Then again, in occupations where the worker comes in contact with water soluble irritant dusts, such as soda ash and lime, those who have an excessive perspiration are more likely to be irritated because these substances only irritate the skin when they are dissolved in water or perspiration.

The diet of a worker influences his susceptibility to external irritants. A number of investigators have proven that when animals have been rendered acidotic or alkalinic, they have been rendered more susceptible to the action of external skin irritants. We can readily see that in human beings the diet may influence the *p*H of a perspiration and the *p*H of a perspiration



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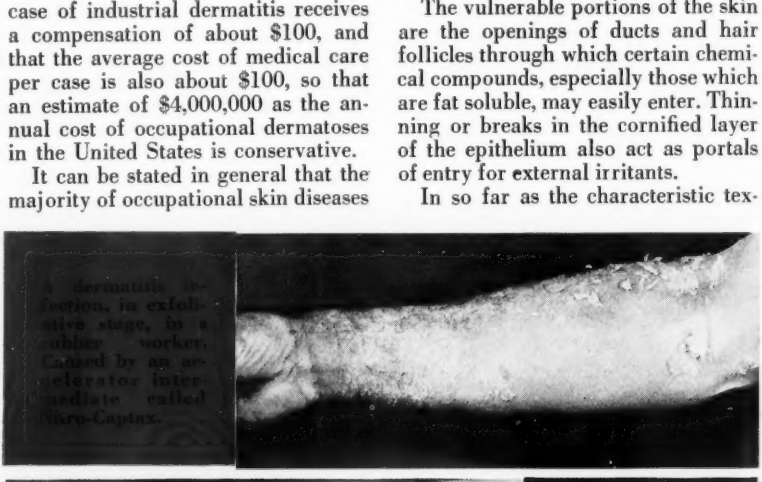

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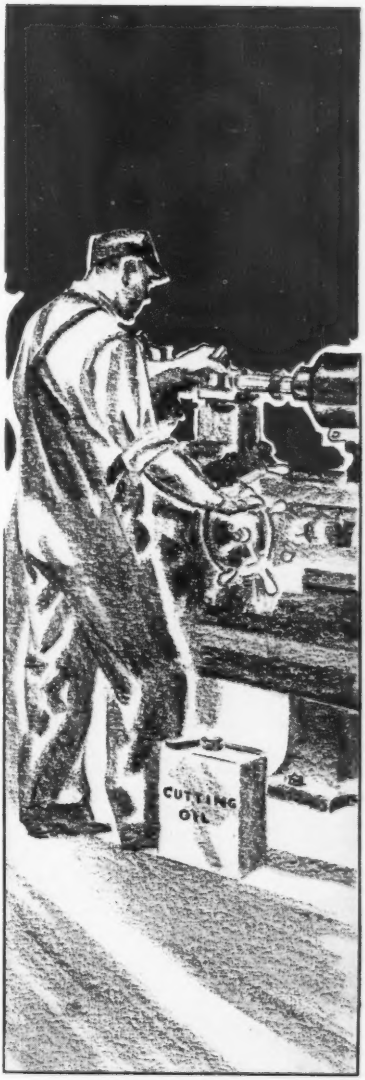

certainly influences its ability to act as a solvent on external irritants. The *p*H of a perspiration also influences its action as a neutralizer of external irritants. For example, if a man is exposed to an alkali, such as soda ash, and he has a markedly acid perspiration, the acid of his perspiration is likely to neutralize the alkalinity of the soda ash, whereas if he has an alkaline perspiration, it may augment the action of the soda ash.

Age, Sex and Season

Age also seems to exert an influence on sensitivity to external irritants. Most of the workers affected with acute industrial dermatitis are young and new workers. On the other hand, the chronic, eczematoid types of industrial dermatitis usually occur in workers of middle age or beyond.

Women are very often irritated by substances in industry with which men usually work with impunity.

Occupational dermatitis is more prevalent in warm weather. This may be due to the fact that little clothing is worn in warmer weather and contact with skin irritants is more likely to occur. Although in those industrial diseases in which lack of cleanliness plays a role, the fact that men are less inclined to bathe after work in the winter than in the summer, may cause winter's incidence to exceed summer's.

The presence of other skin diseases, especially of the itching type where scratching tends to rub in any irritant which may be deposited on the skin, also predisposes to industrial dermatitis. It has also been noted that those workers suffering with seborrhea and with mycotic infections are very prone to develop industrial dermatitis.

The most important predisposing cause of industrial dermatitis is, to my mind, the lack of cleanliness. Cleanliness of the environment—that is to say, clean rooms, clean floors, clean walls, clean machines and the air kept free from irritating fumes, vapors and dusts, will diminish the occurrence of industrial dermatitis. Personal cleanliness is of equal importance. The daily changing of clean underclothes and work clothes, cleansing shower baths immediately after work is finished, so as to remove potential irritants from the skin, are all important factors in preventing industrial dermatitis.

By this we mean a hypersensitivity in which an antibody is produced in the system in response to an external irritant which acts as an antigen. This antibody can not be demonstrated in all cases. Most cases of industrial dermatitis are not due to allergy. They can be explained by changes in the defense mechanism of the skin of the worker or by increase in the vulnerability of the skin, or by an excessive amount or concentration of the external irritant. However, the fact that there is a specific hypersensitivity of certain individuals to the action of many substances in industry can not be denied. I have seen cases where the mere presence in the same room with certain nitro compounds has produced pruritus in the hypersensitive individual.

Allergy can be acquired by exposure to certain substances. This exposure may be through the skin or through the respiratory or gastro-intestinal tracts. Allergy to mercury, chrome and formaldehyde has been

[*Continued on page 46*]

The Compensation Laws

Forty-six states now have workmen's compensation laws. All but a dozen of them carry provisions of one type or another on both health and safety hazards.

By MARSHALL DAWSON
U. S. Workmen's Compensation Survey

UNDER workmen's compensation a worker who is injured in the course of his employment receives benefit payments and medical care without having to prove that the employer's negligence caused the accident. Such legislation introduced a new principle, unknown to the common-law, which held that a worker, in accepting employment, assumed the risk of accidents likely to occur in such work and the chances of injury at the hands of his fellow-workers, and also held that the worker who sued an employer for damages must prove his own freedom from negligence. In the face of such legal defences few injured workers recovered damages in the courts, and too often when the claimant won his law-suit the prolonged and costly litigation consumed much of the money awarded him.

Workmen's compensation legislation has been the pioneer in the American movement for social security. After a brief period of experimental legislation, the earliest State laws that are still in effect were passed in 1911. Forty-six states and eight Provinces in Canada now have workmen's compensation laws.

Most of the compensation laws not only gave the injured worker a new basis for claiming benefits, but also provided a simpler means of action upon claims than suing in the courts. The compensation laws are administered by boards and commissions in all but a few states. Court administration is still found in Alabama, Louisiana, New Hampshire, New Mexico, Tennessee, Wyoming, and Alaska. In some states the method of settling claims is still too complicated and there are formal hearings somewhat similar to court trials. But, in general, the aim of the compensation system is to furnish the worker a prompt, just, convenient and inexpensive means of securing the benefits provided by the law.

None of the State or Provincial compensation laws cover all employments. Usually agriculture, domestic service, and employments casual in nature, are exempted from the provisions of the act. In some jurisdictions, however, such employment may

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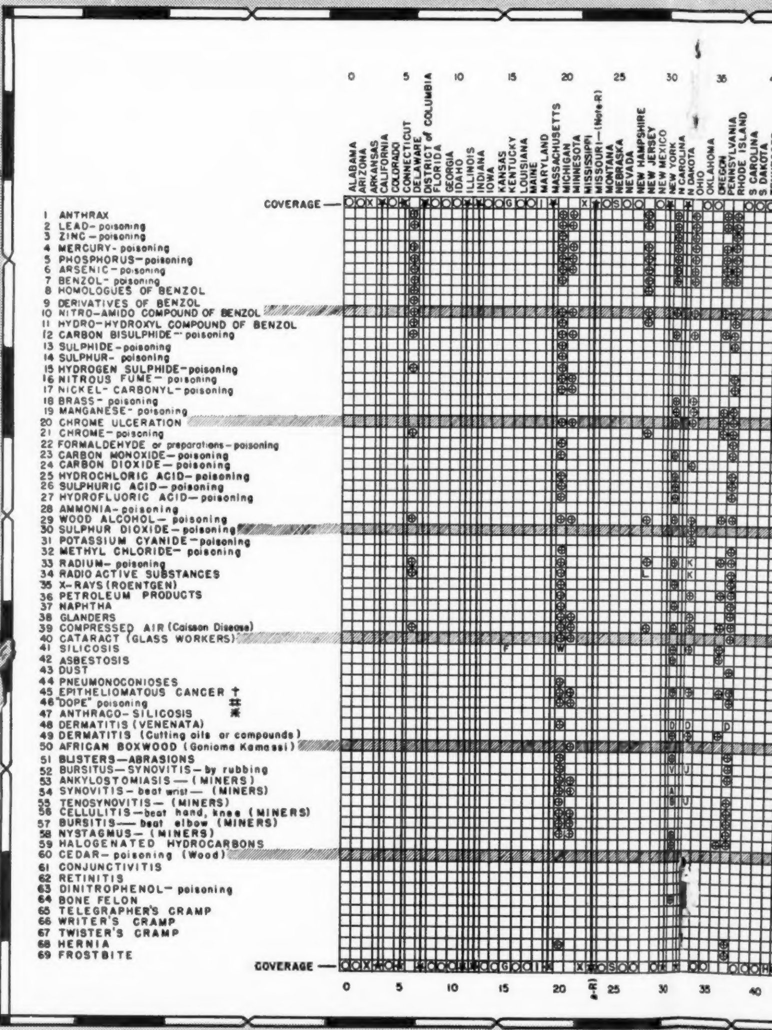
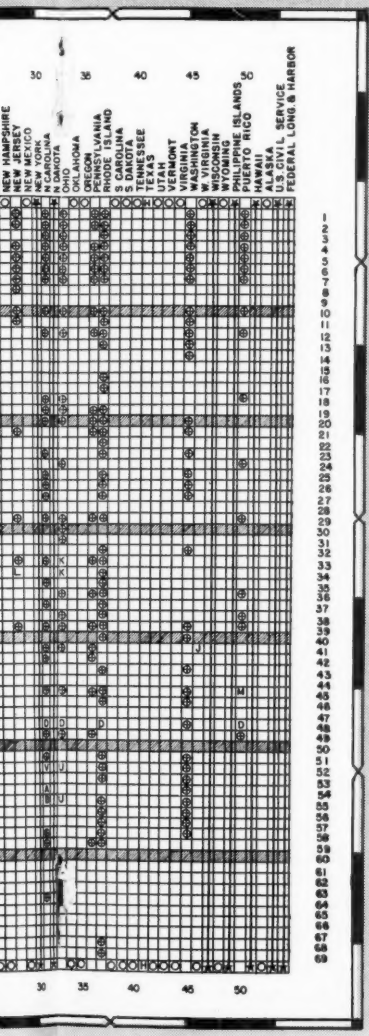
Occupational Disease Coverage



verage by State Compensation Laws



- ⊗ Compensable diseases in schedule.
- ★ States in which there is general coverage.
- ○ State in which occupational diseases are excluded.
- X States having no Workmen's Compensation Act.
- A Only Synovitis caused by trauma in employment is compensable.
- B Only Tenosynovitis caused by trauma in employment is compensable.
- C Only Miner's beat hand is compensable.
- D Any Dermatitis or ulceration of the skin or mucous membrane of nose or throat produced by dust, fumes, vapors or liquids is compensable.
- E Cataract from the rays of molten or red hot metal is compensable.
- F Silicosis is compensable only upon joint election.
- G Act excludes disease except where it is the natural and direct result of a traumatic injury but includes that due to the inhalation of any kind of gas or mine smoke.
- H In Texas the courts have interpreted the Act to exclude occupational diseases.
- I In Maryland the courts have interpreted cases of slow onset as an accident and awarded compensation.
- J Silicosis Act is elective for both employers and employees.
- K Only Radium and Radioactive substances used in luminous paint are compensable.
- L Only Mesothorium is compensable.
- M Only ulceration of skin or corneal surface of eye is compensable.
- N Act provides for cement burns and inflammation and ulcerations from sulphur or sulphur gases in mining.
- O Only infections from sugar are compensable.
- P Only Conjunctivitis and Retinitis due to welding are compensable.
- Q Only poisoning by the halogenated hydrocarbons of the aliphatic series is compensable.
- R Missouri has an elective provision.
- S Nebraska law covers occupational diseases peculiar to the smelting, metal refining and lead storage battery manufacturing industries.
- T Conventions adopted by International Labor Office.
- U Occurring in the hand as a result of repetitive motions, vibrations or continued pressure.
- V Bursitis of the knee or elbow due to intermittent pressure.
- N Stone workers or grinders phthisis included.

The horizontal shaded lines are intended as an aid to the eye in reading this chart. They have no other significance.

A total of thirty-four states now compensate for occupational diseases. Ten states have general coverage acts, the remainder restricting compensation to specified diseases. The statutes in all cases, with the exceptions of North Carolina and New Jersey, include descriptions of the processes in which the diseases must occur to be compensable.

Those states compensating for occupational diseases and not so shown in the above schedule do so under liberalized interpretations of former-accident compensation laws; by specific legislation passed subsequent to Jan. 1, 1938, date the above data was released by the U. S. Department of Labor.

be brought under the law through the voluntary acceptance of the employer, employee, or both, or by taking out insurance. Moreover, under prevailing conditions throughout the United States and Canada, small employers are usually outside the scope of the act or else in many instances escape compliance with its provisions. The "numerical exemptions" in the state laws, under which small employers may remain outside the compensation act, range from employers with 2 employees to employers with 16 employees. Some states list the employments that are covered, limiting the scope of the act to employments named as "hazardous" or "extra-hazardous."

Two Types of Laws

Compensation laws may be classed as compulsory or elective. A compulsory law is one which requires every employer within its scope to accept the act and pay the compensation specified. There is no choice. Under an elective act the employer has the option of either accepting or rejecting the act, but in case he rejects, he is exposed to damage suits for work-injuries, with the customary common-law defences removed. It has been said, therefore, that the elective acts involve a degree of compulsion little less than that of compulsory acts.

The purpose of the compensation statutes is not only to provide for prompt and full payment of benefits to injured workers but also to make certain that compensation is paid. Therefore the insurance of workmen's compensation risks is required by practically all the states, except that in some instances responsible employers are allowed to qualify as "self-insurers." In some states workmen's compensation insurance is carried by private stock or mutual-insurance companies; in others, the insurance is carried by a state fund exclusively; in still other states, a public fund exists side by side with private insurance carriers. In 8 states (including Puerto Rico) there are exclusive funds, and in 11 states, "competitive" funds.

THE provision for payment, or the benefit scale, has been called the heart of the compensation system. Upon its adequacy rests the injured worker's chance for decent maintenance during helplessness and the protection of his dependent family from destitution or lower living standard. As a rule, the payments are based upon a percentage of wages. At present, the maximum per cent of wages payable as death benefits ranges from 42½ per cent in one state to 66 2/3 per cent in others; for permanent total disability, from 50 per cent to 70 per cent, wth ithe maximum compensation per week varying from $10 in one jurisdiction to $25 in others, while minimum weekly payments range from $3 a week in one area to $15 a week in another. The waiting time during which no compensation is paid varies from "no waiting time" in Oregon to from 10 to 14 days in a group of five states. In all the jurisdictions that pay upon a percentage-of-wage basis the amount of compensation paid is also affected by the method of determining the wages received by the worker. It makes a great deal of difference, in the compensation payments, whether the compen-

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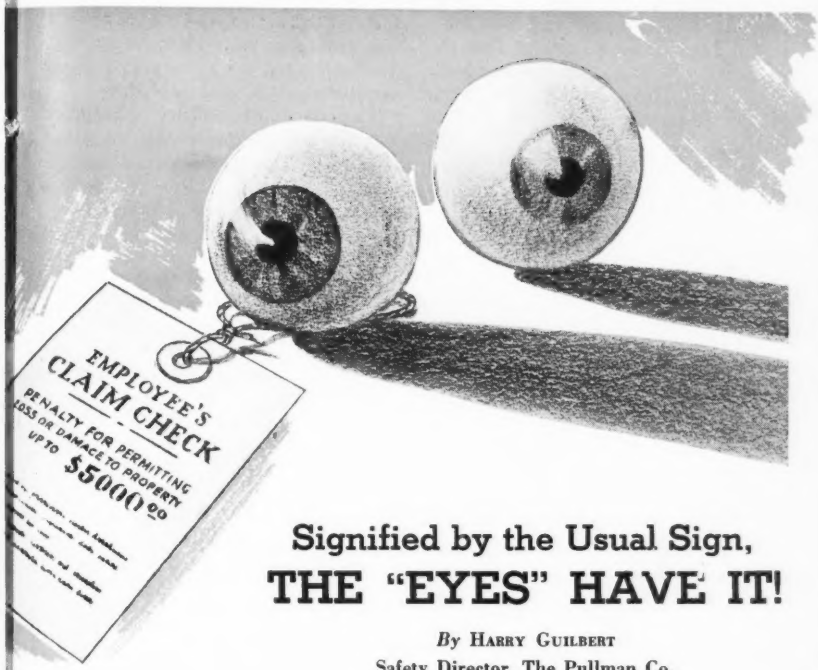


Signified by the Usual Sign, THE "EYES" HAVE IT!

By HARRY GUILBERT
Safety Director, The Pullman Co.

A FEW YEARS ago we spent $25,000 to reduce an item of Pullman's costs. The reduction amounted to $116,000, a tidy sum in any business. We not only regained our outlay, but showed a net profit of 364 per cent. Had this involved improvements in production equipment or methods, hundreds of engineers, plant executives, and others would be eager to adopt our idea.

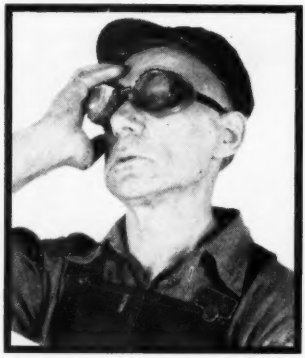
But when the average plant executive hears *how* we made this 364 per cent net profit on an outlay of $25,000, he reverts to habits formed before he learned that all industry is basically alike. He hears of our record and then says, "Oh, that wouldn't work in our line," or else, "Our business is different!"

Doubt its adaptability to your business all you please, the figures are still mighty interesting to alert management. We spent the $25,000 to put goggles on every Pullman Company employee in work even remotely hazardous. We enforced the rules on wearing them, and in two years got the investment back—with a 364 per cent profit. You might say Pullman

has 25,000 employees and you have just a fraction as many, or that the nature of your work is less hazardous. What of it? The percentages will hold. If you cannot increase your profits $116,000 in two years, neither will it cost you $25,000. A profit of $1,600 on an investment of $250, for example, is not to be sneezed at.

WHAT is being done in industry in general to protect sight? The answer is, "Very Little," which is proven by the fact that accidental eye losses now cost industry about fifty million dollars a year. Of course this figure merely represents the direct costs. Add to it wage deprivation, hospital and medical expenses, etc., and the total is staggering.

The sad part of it is that accidental eye injuries in industry are absolutely preventable, despite the fact that virtually every job in a plant, all or part of the time, involves hazards to the sight. The one solution to the problem is an inviolable order as to the use of goggles, helmets, etc., in accordance with prescribed rules. No exceptions can be made and prompt discharge should be the penalty for violations. Even visitors should not be allowed in the plant unless they agree to abide by the order.



The protection of goggles is invaluable to every worker.

There is much of a humanitarian nature involved in industrial eye protection, but even if there were not, the economic motive is sufficient to make it near the top if not the very peak of occupational hazard problems.

In order to get an idea of the great number and the percentage of industrial eye accidents compared with the total of all industrial accidents, it is well to consider a typical industrial state like Ohio, which reports an average of 235,000 accidents in industry in one year. Of this number 20%, or 47,000, were eyes cases.

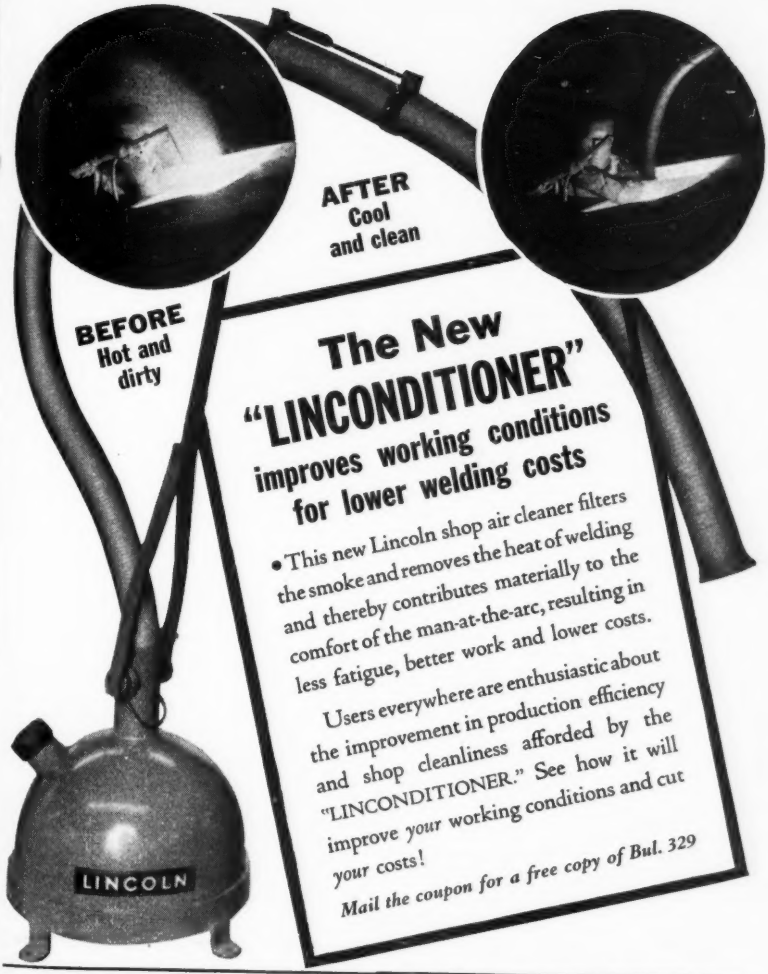
Of the 3,411 permanent industrial injuries in Pennsylvania in one year, 468—or 20%—were disabling eye accidents.

In Utah eye cases constituted 9% of all injuries which resulted in permanent partial disability.

The best figures obtainable indicate that in 16 states during one year, more than 1,000 people lost their entire vision of one eye and of this number 32 lost both eyes because of industrial accidents.

Of the 46,000 industrial eye accidents reported in the State of Ohio in one year, 231 eyes were lost. Using the same ratio for the estimated 300,000 industrial eye accidents which occur annually in the United States, this means that 1,600 eyes are lost in industry. The medical cost of treating eye cases averages about one-third of the compensation.

A very conservative estimate of the



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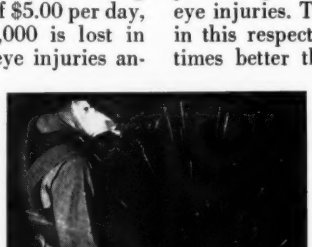
time lost on account of eye injuries is 3,600,000 days per year. Using an average wage rate of $5.00 per day, we find that $18,000,000 is lost in *wages* on account of eye injuries annually experienced.

Of course, *compensation* costs vary in different states: In Pennsylvania the loss of an eye is compensation for a period of 125 weeks and averages $1,900. In New York the average is also $1,900. In Missouri, New Jersey, North Carolina, Washington and Wisconsin, as further examples, the average eye *case*, including all major injuries, costs management $375. There are about 70,000 compensable eye accidents in the United States per year. A figure of $53,000,000 is a conservative estimate of their combined costs—medical expense, compensation and wages lost. And this is a conservative estimate, because we are not taking into consideration the great indirect costs of production delays, subsequent reductions in earning power of one-eyed men, etc. Here we are taking into account just the direct losses, and according to the best authorities we can safely multiply the direct costs by four to find the indirect ones.



Grinding is typical of operations demanding goggles.

There has been a great deal of talk but not enough action where the conservation of vision in industry is concerned. The safety record of the Pullman Company reflects intelligent management, particularly in that part pertaining to our campaign against eye injuries. The fact that our record in this respect is some ten to eleven times better than that of companies whose eye hazards are comparable to ours is largely due to iron-clad rules and definite "merchandising" of our safety programs to our employees.

There is a sign at the entrance to each of our plants over the name of our company president requesting visitors to wear goggles. The gateman never argues with them. He simply points to the sign, and that's usually enough.

Every time we have to replace a broken pair of goggles, we take an affidavit from the employee and mount it on a bulletin board along with the goggles and the object that broke them. By far the greatest number come from men and women on jobs where no employer but the Pullman Company requires them to wear goggles—which means, of course, that even though we succeeded in keeping goggles on grinders and chippers, we should probably have to pay compensation on at least five or six eyes a year, and heaven alone knows how many so-called minor injuries such as those caused by cinders, dust, and so forth.

When I first became interested in the conservation of vision, goggles were rather crude because at that

time there was no kind of glass that would withstand heavy blows without breaking.

Over the years, however, glass has been developed that has all the essential qualities for the risk. We use the best grade of glass that money can buy and it is tempered so that it will stand amazingly hard blows.

BY NO means will every goggle on the market stand such abuse, and we keep a sharp lookout for the invasion of inferior glass. Despite the fact that we supply the best grade of goggles at no cost to the worker, occasionally a new man brings a pair of his own and I give him a demonstration by striking the lenses with the handle of a paper knife, often shattering them instantly.

"Hey," yelps the man, "those cost me a dollar."

"Well," I reply, "you didn't get much for your money. You don't have to buy goggles. We give them to you."

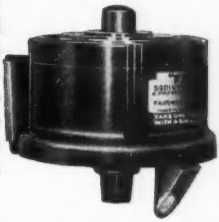
I show him another demonstration using a pair of our own, and say: "That's the kind we give you. A lot of good that junk of yours would be in stopping a piece of flying metal!"

Newcomers frequently object to wearing goggles, but the old-timers are so sold on the idea that many of them take their goggles home and wear them while chopping kindling wood or stoking coal or doing other household jobs.

Heat Sickness was defeated by FAIRWAY Services and FAIRWAY information — over nine years ago.

But it has to be defeated all over again every year and this is best accomplished with these improved FAIRWAY TABLETS & DISPENSERS used by leading industries everywhere.

To those who want authoritative information on the cause and effect of Heat Sickness, we will mail our new booklet "Are Your Workers Worth Their Salt" at no charge. Details of these modern molded plastic dispensers are included.



Left—Fairway "Junior."
Right—Fairway "Midget."

FAIRWAY LABORATORIES, INC., 1530-48 North Hadley St.
ST. LOUIS, MISSOURI, U.S.A.

By NORMAN MANN
Industrial Safety Consultant

WE OWE a great deal to the Chinese, beyond a few outstanding laundry bills—including gun powder, paper and printing and other contributions for and against the advance of civilization. Particularly is modern industry indebted to them for the idea of paying a doctor to keep employees healthy rather than waiting to call one in after the occurrence of accidents or illness.

The industrial physician has paid his way and returned a profit to astute managements without regard to size of the companies. Case after case of illicit industrial health and accident compensation claims have been paid or denied by virtue of the absence or presence of the industrial physician factor, as witness these actual cases:

A molder was employed in a certain eastern foundry and after a month's employment reported a hernia together with a compensation claim for the injury. Accepting the claim as being of entire good faith, the foundry management had it in line for payment when, during the course of a discussion with the claimant as to his physical fitness for future employment, he let slip the fact that his hernia was of childhood origin. Of course his compensation claim was promptly disallowed, but this employee came very close to perpetrating a swindle that would have been impossible had the foundry enjoyed the services of an industrial physician. A routine physical examination conditional to employment would have revealed the hernia and the claim would never have been presented.

Less fortunate than this foundry management was that of a Great Lakes vitreous enameling plant on a compensation claim further illustrative of the value of the industrial physician's services. The plant employed an experienced enamel worker who, after four months on the payroll, suffered a series of respiratory hemorrhages. She filed, as a silicosis victim, a compensation claim, despite the unquestionable fact the the disease had been contracted in the service of a

previous employer. The compensation claims court ruled, however, that her present employer, being unable to prove *absolutely* that such was the case, would have to pay the claim. The cost of the settlement was considerably more than any good industrial physician would have charged for examination of *all* of this company's employees for several years.

Dual Aspects

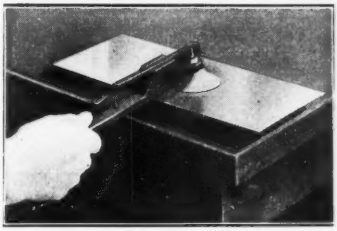
A logical principal in dealing with all types of industrial health and accident hazards is that of engineering control and prevention. Equally important, however, and closely interrelated with the engineering phase, is medical control and check of occupational hazards. Medical control under the direction of a competent industrial physician jointly serves the purposes of proper placement of new workers, guarding the health of all employees and as a check on the efficacy of engineering controls already instituted or to reveal the need for new protective equipment.

The initial, and one of the most important phases of the industrial physician's work is that of the pre-employment examination to determine physical and mental fitness for general or specific jobs. These examinations disclose contagious diseases, minor physical defects which might later develop into major ones, and assist in the best allocation of applicants to the work for which they are best fitted.

There are numerous industries in which exposures to hazardous conditions are not immediately or violently toxic, and periodic re-examinations of all employees is accordingly both de-

[*Continued on page 48*]

IPCO SAFETY VACUUM LIFTER



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For lifting, feeding and positioning metal blanks in stamping machines and die presses, rapidly transferring metal, fibre and other non-porous materials from piles or stacks, especially when oily or greasy and difficult to grasp with the fingers.

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This Month in Washington

By W. T. CAMERON
Chief Safety Adviser, Division of Labor Standards
U. S. Department of Labor

REPRESENTING every division of the National Government, officials and members of the Federal Inter-departmental Safety Council convened in Washington September 13 for their first annual meeting and discussion of safety progress on behalf of the nation's largest employer.

Authorized by the President in March, 1937, following a survey's disclosure of private industry's superior safety record, the Council was able to report substantial if unspectacular progress for its first year's work.

The scope of the Council's attempt at a concerted health and safety drive across all Federal employee fronts is tremendous, as evidenced by a payroll total of an average 2,940,200 workers. These employees, about two-thirds on "mode work," rolled up a total of four and one-half billion man-hours of work, and of accident exposure, during 1937.

Reports of injury filed with the Federal Employees Compensation Commission by all agencies of the government total 222,144 for 1937, of which 1,475 resulted in death. The direct cost of compensation benefits paid and payable because of these injuries is estimated at $9,929,000. This figure does not take into account the value of medical treatment provided through government facilities, administrative cost, wages paid for the 377,406 days leave of absence involved, the value of property damage and other indirect losses.

Federal Establishments accounted for 37,072 of the reported injuries, 278 of them being fatal. Approxi-

mately 93 per cent of the claims presented in connection with them were approved for payment. The non-fatal cases ran up a cost of approximately $1,976,645 altogether, while the fatal cases averaged a cost of $9,760 each.

The Works Progress Administration reported 170,000, of the total injuries, or approximately 80 per cent. The Compensation Commission approved claims of 159,181 non-fatal cases in this group and of a little less than 50 per cent of the 819 fatal cases as coming within the scope of the compensation law. Death claims in this group carried an average estimated award of $4,000.

This monthly department will be devoted to Federal agencies and their services and activities in health and accident hazard matters.

The Civilian Conservation Corps reported 10,072 injuries for the same 1937 calendar year, 388 of them resulting in death. There were 6,730 non-fatal claims approved for payment, at an aggregate cost of $235,576. In 122 of the fatal case claims the Commission found the enrollee's death within the scope of the compensation law, paying a total of $177,635 in settlements.

Among gratifying records established by government groups during 1937 were the following:

Soil Conservation Service, with 70,000 employees, showed a decrease of 31 per cent in accident frequency and 35 per cent in accident severity in the first six months of 1938 over those of 1937.

The Post Office Department, with 230,000 employees, achieved a 51 per cent reduction in the ratio between accidents and hours of service; a 70 per cent reduction in the ratio of auto accidents per miles traveled; and a 38 per cent reduction in total number of accidents.

The Works Progress Administration, whose full 1937 safety record has been quoted, has shown a decrease in frequency rate of accidents among its one and three-quarter million employees of from 41.0 in 1936 to 16.3 in 1938; a drop in severity of from 1.91 in 1936 to 1.79 in 1937.

Both industry at large and the general public are largely unfamiliar with the dual attack their Government is and has been making on health and accident hazards. The first and least familiar to them is of the internal type just described. Internal Federal safty programs are by no means a novelty, and indeed became general therein as far back as 1917 when the Employees Compensation Commission was first established. It is the new joint and concerted attack that should be productive of much valuable information of interest to industry at the present time.

The second of the dual attacks, the one most familiar to industry, is that which is conducted through such agencies as the Bureau of Mines, the Bureau of Standards, the Interstate Commerce Commission, the Coast Guard and the Division of Labor Standards. Strangely enough, however, a great portion of industry is wholly or entirely ignorant of the services available from these agencies. It would be well repaid for the effort of finding out.

How about

THE MEDICAL *and* THE SURGICAL

treatment of your occupational hazards and safety?

We congratulate the publishers of OCCUPATIONAL HAZARDS & SAFETY magazine, and we pledge our sincere co-operation to assist them in their efforts to reduce occupational diseases and increase occupational safety through engineering and production angles

. . . just as INDUSTRIAL MEDICINE, the official publication of the American Association of Industrial Physicians & Surgeons, has labored 7 years professionally to this end.

OCCUPATIONAL HAZARDS & SAFETY gives you the engineering and production side of industrial hazards and safety.

Industrial Medicine

gives your medical director or your serving physician and surgeon the ways and means of combatting the scientific, medical and surgical problems so acute to reduce your compensation losses.

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OUT OF THE RECORDS

A department to report the trend of court decisions on workmen compensation matters. The cases briefed will be as current and as representative as possible.

New York Court Rules Hernia a Disease

The claimant in a recent New York Court of Appeals compensation case was employed as a glass gatherer, collecting and lifting glass from a furnace. He used a ten pound implement called a "punny" in the work, the use involving a constant twisting and straining of the body. This action, from gradual stretching, resulted in a hernia.

In affirming the award made by the Workmen's Compensation Commission, the court determined: Hernia was an Occupational "disease" under the Workman's Compensation Law, and compensable. *Foster vs. Gillinder Bros., Inc., et al.* (July, 1938), 278 N.Y. 348, 16 N.E. (2nd) 360. (N.Y.)

What Constitutes a Hazardous Business?

The following cases indicate that the above question may in specific instances. be a difficult one to answer with certainty.

In Louisiana, the Workmen's Compensation Law designates certain businesses as hazardous per se. Dairies are not so designated. Nonetheless, an award was made for the death of the general manager of a dairy, killed while driving a company truck. The Compensation Act contained a provision making the following trade or business hazardous: "The installation, repair, erection, removal or operation of boilers, furnaces, engines and other forms of machinery." Since the dairy maintained a motor truck, and its plant consisted of a boiler, pasteurizing equipment and refrigerator system, the court brought it under the foregoing provision of the act and held it to be a hazardous business. *Staples vs. Henderson Jersey Farms, Inc.* (March, 1938) 181 So. 48. (Louisiana)

In Oklahoma a cook in a restaurant was denied an award for a hernia on the ground that a restaurant was not a hazardous busi-

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ness. The restaurant contained electric refrigerators, carbonator, mixing machine, and slicing machine. The Workmen's Compensation Law had a provision making hazardous "a factory or workshop where machinery is used." The court found that the restaurant did not come within the purview of this section. *Plaza Grill et al. vs. Webster, et al.* (April, 1938), 78 Pacific (2nd) 818. (Oklahoma)

Claimant's Failure to Obey Safety Rule no Defense

The claimant in a recent Texas compensation case was a metal finisher working along the assembly line in the Ford Motor plant in Dallas. Other workers nearby were grinding down joints on automobile bodies which had been treated with lead compound. There was much lead-impregnated dust or fine metal filings floating in the air. An employee in attempting to remove this dust with a blast from a compressed air hose, blew a cloud of dust into the claimant's face, eyes, nose and mouth. Shortly thereafter, the claimant became disabled from lead poisoning.

An award was made to him on the basis of an industrial accident, since the blast from the air hose was sudden, unforseen and unexpected. Had the lead poisoning been caused solely by the gradual absorption of lead dust as part of the claimant's job, it would not have been compensable, as Texas is one of the states yet to expand its compensation laws to include occupational disease as well as accidental injury.

The claimant who had been furnished with a respirator, was not using it. The court stated that his failure to use the respirator, contrary to his employer's rules, would not defeat his right to compensation. *Travellers Insurance Company vs. Burden* (February, 1938), 94 Fed. (2nd) 880. (Texas)

Liability Found for Acceleration of Dormant Diseases

The immediate injury sustained by an employee may have far reaching effects, not apparent at the time of the accident.

A workman sustained a hernia in the course of his employment. He underwent an operation to cure his condition. The shock of the operation lighted up a dormant condition of nephritis (kidney disease), which resulted in his death. An award made for the death was found to be justified even though the nephritis was not the natural result of the accident. *Dunn vs. Atlantic City* (April, 1938), 199 A. 5. (New York)

●

Damned Clever, These Chinese

[*Continued from page 33*]

sirable and profitable. This is particularly true in view of the fact that many occupational diseases tend to clear up and recur, and in the presence or absence of physical records for previous employment, such periodic checkups are invaluable in determining the origin possibilities of occupational diseases.

INDUSTRIAL management, for concerns no matter how small, cannot afford to run the risks attendant to compensation claims under the rapidly broadening statutes without the protection an industrial physician offers. Personnel managers, foremen or superintendents cannot be expected to discover the inroads of cumulative hazard effects, as even a great many general physicians are unable to properly diagnose some of the industrial diseases. A trained industrial physician, with specific experience in the field concerned, permits a highly profitable adoption of the Chinese idea of maintaining good health rather then paying through the nose for injuries and illnesses after they have occurred.

WE'D LIKE TO KNOW

The editors will gladly answer the questions of readers on any phase of industrial health and safety, without publishing their names.

Toxic Agent

We have the problem of finding an effective substitute for benzol as a thinning agent. Tuluol was tried but we have heard that it is unsafe. Can you recommend a better one?

M. K. B.—Philadelphia

The thinners you mention, together with xylol, constitute a high toxicity group. Benzol, being the most volatile of them, is consequently the most dangerous. The choice of a substitute for any organic solvent should be one of the lowest volatility consistent with production requirements.

Silicate Infection

A number of our shipping department employees have been afflicted from time to time with skin infections of the hands and arms. The only thing to which we can attribute the trouble is their use of silicate of soda in sealing cartons. Is this a particularly dangerous substance?

R. R. D.—Chicago

We assume you are using the silicate of soda in liquid form, which is generally known as waterglass. Gloves should be used in applying it, as it has a strong drying action on the skin. In dry form silicate of soda is merely ground glass and if you handle any quantity of the powder the use of respirators is recommended.

State Laws

Can you provide us summaries of the occupational disease laws of the various states in which they have been enacted, or should we write the state capitals in each instance? *R. L. M.—Evansville, Ind.*

You may secure a free copy of all the state occupational disease legislation by addressing a request to the U. S. Bureau of Labor Statistics, Washington, D.C.

SELLSTROM SAFETY ★

With Comment

For Working Eyes

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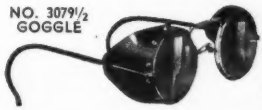

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New Produc

CARTRIDGE RESPIRATOR

Willson Products, Inc., 419 Thorn St., Reading, Pa., announce a new low-resistance Chemical Cartridge Respirator especially designed for plating operations, brazing, paint spraying, etc., and for use in light concentrations of organic vapors and acid gases.

This new respirator employs two inexpensive replaceable cartridges which, it is claimed, results in a very low breathing resistance. The use of extra large cartridges affords an unusually large degree of protection.

Three separate chemical fills are available depending upon the use to which the respirator is to be put. The manufacturer points out that under no consideration should this respirator be worn for protection against carbon monoxide or in an atmosphere deficient in oxygen.

COMPACT EXHAUST UNIT

The Abrasive Machine Tool Company, East Providence, R.I., announces a motorized dust exhaustor consisting of a direct connected motor and exhaustor, a dust separator, a dust controller and nozzle. The entire unit requires five square feet of space, is powered by a ¾ H.P. motor and weighs approximately 130#. The manufacturer claims a 98% efficiency in separating sawdust; 95% in separating steel chips; and 90% plus, in separating cast iron dust.

NEW FACE MASK

Industrial Products Company, Philadelphia, Pa., announces a new type of face mask for use in the chemical industries for protection of the eyes and face. Manufactured of sheet aluminum with an acetate window, the new mask may be worn with or without correction glasses.

SALT DISPENSER

A new salt dispenser said to provide a handy way for workers to get their daily ration of salt to prevent "heat sickness" is announced by the International Salt Company, Inc.

IN THE FIELD

FLEXIBLE EYE SHIELD

A new type eye shield is announced by the Jackson Electrode Holder Company, Detroit, Mich. The eye shield consists of a flexible, transparent, non-inflammable visor, adjustably hinged to a high headgear. No part rests on the nose or ears, and it is therefore claimed that there is no interference with correction eye glasses if worn. The shield is said to provide ideal protection for workmen engaged in soldering and welding operations and for general eye protection in industrial plants.

SANITARY SPRAYHEADS

"Self-cleaning" sprayheads have just been announced for Bradley Washfountains.

The new design makes it possible to flush or brush out lime deposits and other foreign matter by merely separating the two parts of the head at the perforations.

The sprayhead consists of three main members, top or body, removable ring and renewable valve seat. All are constructed of heavy brass, with exposed surfaces chromium plated, satin finished.

PORTABLE LAMP GUARD

The Safeguard Electric Company announces a new portable type lamp guard which is completely waterproof and requires finger pressure only to lock the cage onto the handle.

NEW SILICA RESPIRATOR

Development of a new type respirator has just been announced from the laboratories of American Optical Company. The respirator was developed expressly for those engaged in mining, tunneling, drilling, quarrying, and the processing of mineral products containing silica.

The manufacturer claims the new respirator is designed to provide for maximum comfort so that workers would not object to wearing it. The respirator has been approved by the U. S. Bureau of Mines for type-A dusts.

New features as reported are: compactness, light weight, little interfer-

ence to vision, ease of keeping in efficient working order, facial adjustment unnecessary, improved valves which ease inhalation and exhalation, and a large effective filter area (42 sq. in.).

WATER TYPE EXTINGUISHER

Pyrene Manufacturing Company announces a 2½ gallon fire extinguisher requiring no chemicals and no annual recharging. A stream of plain water is discharged by means of pressure from a carbon dioxide gas cartridge. The extinguisher is recommended for fires in ordinary combustibles such as wood, papers, rubbish, etc., and is operated by turning it upside down and striking the plunger in the ring cap on the floor. Underwriters' Laboratories approval and Factory Mutual Laboratories approval are listed.

ECONOMICAL FUSE CLAMP

The Ideal Commutator Dresser Company, Sycamore, Ill., announces a new fuse clip clamp which is said to insure 100% contact permanently and to prevent fuses from heating and burning. Available in five popular sizes, it is claimed that the clamp saves up to 6% on current consumption.

LOW COST HUMIDIFIER

A recent announcement by the Mayflower-Lewis Corporation, St. Paul, Minn., is of the development of the Mayflower humidifier for low cost air conditioning of heated rooms. The new apparatus is portable and is said to reduce the possibility of respiratory diseases.

SAFER HOIST

Coffing Hoist Company, Danville, Ill., announces the new Power Master, a gravity lowering hoist said to increase speed, power and safety in the handling of materials in industrial repair shops and maintenance work generally.

NEW HOSE MASK LINE

Announced by Mine Safety Appliances Company is a complete line of Hose masks with the new M.S.A. Displacement Blower. The new blower, officially approved by the U. S. Bureau of Mines, is equipped throughout with self-lubricated permanently sealed ball bearings.

The definite displacement principles employed, it is claimed, assures controlled, even air supply at all times. A specially designed calibrated pressure release valve gives an audible signal when excess air over actual requirements is being delivered. This valve can be set for operation depending on the particular length of hose being used, so that a minimum number of revolutions per minute will be required to deliver the necessary amount of air. The assembly also has a fresh air by-pass valve that will automatically function in case of blower stoppage, allowing wearer to breath easily through the hose.

ORGANIC VAPOR MASKS

The Acme Protection Equipment Company, Inc., Pittsburgh, Pa., manufacturers of respiratory protective devices, announces Official Approval of Acme Full Vision Gas Masks Nos. 4 and 4A by the U. S. Bureau of Mines for organic vapors. A feature of these new masks is said to be the full vision safety glass lenses which permit the wearer to see the same as when not wearing a

mask. Another feature is the dead air check valves on the outlet ends of the fresh air ducts. These valves automatically open and close upon inhalation and exhalation, and prevent the accumulation of exhaled breath in the fresh ducts.

CARBON DIOXIDE TESTER

F. W. Dwyer Manufacturing Company announces a new pocket carbon dioxide indicator weighing less than 3 lbs. A gas sample is pumped into the indicator with a few strokes of a bulb, the reading being taken from a mercury column after simple manipulation of an absorbing unit. The new indicator is said to be easily used and understood, even by inexperienced operators.

PAINTING PROTECTION

Efficient and comfortable protection against harmful gases and vapors given off by the liquid vehicle of paint during paint spraying operations, as well as light concentrations of organic and acid gases occurring singly or in combinations is said to be provided by M.S.A. Chemical Cartridge Respirators.

Available in two styles, the facepieces of both are all-rubber, easy to adjust and fitted with a gas-tight seal.

RESISTANT COVER GLASS

Immunity to pitting and resistance to heat plus clarified vision and ability to outlast ordinary glass 10 to 50 times, are a few of the advantages claimed for M.S.A. Coated Cover Glass, as manufactured by the Mine Safety Appliances Company, Pittsburgh, Pa.

Used in welding and cutting operations, M.S.A. Coated Cover Glass is said to increase working efficiency and provide positive protection against molten sparks fusing to its surface, thereby obviating blurred vision, eyestrain and resultant inferior work.

GENERAL SERVICE MASKS

Mine Safety Appliances Company of Pittsburgh, announces official approval by the U. S. Bureau of Mines of the M.S.A. Air Line Respirator (approval No. 1909) and the M.S.A. Abrasive Mask (approval No. 1907).

For use in many common industrial operations and processes which expose the worker to harmful dusts and fumes, the M.S.A. Air Line Respirator is said to provide protection against welding and cutting fumes, paint spray vapors and pigments, fumes from molten or burning metals and toxic dusts.

ABRASIVES MASK

The M.S.A. Abrasive Mask, weighing less than four pounds, it is claimed gives protection to the wearer from the heavy concentrations of fine dust present in shot and sand-blasting operations.

FOR HEAT SICKNESS

Common salt, properly administered, has been tested and approved as a scientific solution for "heat sickness." A new salt tablet dispenser made by Fairway Laboratories, St. Louis, a molded plastic unit, is claimed by the manufacturer to make the preventive of this occupational hazard easily available in handy form.

The publications briefly described in this service department are prepared by technical experts in the employ of manufacturers producing prevention equipment and supplies for the health and accident hazards fields. Many of the publications are quite expensive, but to genuinely interested readers they will be sent free of charge or obligation. A coupon is provided herewith for the purpose.

NO. 011—SAFETY AND POWER:

A 20-page booklet by the Rowell Manufacturing Company discussing that company's ladles, car movers, rail grippers and other safety devices. Particularly designed for distributors.

NO. 012—INDUSTRIAL VACUUM CLEANER:

Bulletin No. 119 by the Spencer Turbine Company discussing the ¾ H.P. portable vacuum cleaner produced by that company.

NO. 013—ROTARY POSITIVE BLOWERS:

A discussion of the operating principles, construction and equipment in the Roots Connersville Blower Corp. Eight pages profusely illustrated.

NO. 014—WATER COOLERS:

An eight-page listing of the Ebco Manufacturing Company water cooler cabinets for electric refrigeration, and a description of their wall and pedestal fountains.

NO. 015—NON-SLIP WAX:

A description of a preparation to apply to smooth floors and hard surfaces. A Flexrock Company folder.

NO. 016—THE EYES OF INDUSTRY:

A folder describing glareless indirect lighting as provided by recessed units described by Curtis Lighting.

NO. 017—MODERN CLEANING METHODS:

A 36-page illustrated folder discussing the cleaning of various metals and of a variety of products such as automobile parts, washing machine parts and other production items. Stripping of paint and the removal of hard water scale deposits are also included. An Oakite Products, Inc. folder.

NO. 018—VENTILATION DATA BOOK:

AIA File Number 12-k-2 Data Book including a description of the H. H. Robertson Company roof ventilators. Included are exhaust capacities of the various sized ventilators and the ventilation requirements of buildings and rooms of various types.

NO. 019—PRESS SAFETY

"Stamping Presses, Their Safety Uses and Abuses" a booklet containing valuable information on the care, maintenance, and operation of stamping presses and especially prepared for those directly responsible for the safety of press operators. Junkin Safety Appliance Co., Inc., Louisville, Ky.

NO. 020—FLOOR PLATE:

An Alan Wood Steel Company 16-page description of a variety of floor plates and specifications for their uses.

NO. 021—FIRST AID BANDAGE:

General Bandages, Inc., description of a material which is for use in first aid and other bandaging, and a description of how to use the material for emergency cases.

NO. 022—VENTILATING SPECIALTIES:

A 16-page folder describing American Foundry and Furnace Company dampers, louvers, grills and ventilators. Engineering specifications are included.

NO. 023—SCOPE OF SANITATION:

An interesting 70-page discussion of the application of disinfectants, deodorizers, insecticides and their applications in industrial plants. A West Disinfecting Company presentation.

NO. 024—FOOT INJURIES:

A highly illustrated 18-page folder by the Lehigh Safety Shoe Company, showing examples of the prevention of injuries by the use of safety shoes in various industries.

NO. 025—DEATH TO FIRE:

A Walter Kidde bulletin giving engineering and technical information on carbon dioxide portable fire extinguishing equipment.

NO. 026—DUST COLLECTING IN METAL INDUSTRIES:

A profusely illustrated 18-page folder by the Kirk & Blum Manufacturing Company giving specific instances of the application of automatic dust collecting systems in foundries, automobile plants, and industrial plants with problems of air cleaning.

NO. 027—INDUSTRIAL GAS MASKS:

The Mine Safety Appliances Company description of tank gauger's masks and other industrial protective devices.

NO. 028—SAFETY SLINGS:

A four-page folder describing Murray Safety slings and their application in industrial work. A Broderick & Bascom Rope Company folder.

NO. 029—FAN SYSTEMS:

A Kirk & Blum Manufacturing Company 32-page folder describing the application of pneumatic conveying systems and blower systems in a wide variety of industries. Heavily illustrated with pictures of specific applications.

NO. 030—CUT ACCIDENT COSTS:

A General Abrasive Co., Inc., folder describing that company's product for application on floors to prevent slipping.

NO. 031—EXPLOSIVES CARRIER:

A two-page Mine Safety Appliance Company description of a convenient means of carrying explosives or detonators.

NO. 032—ONE-HOUR OXYGEN APPARATUS

A new Mine Safety Appliance Company bulletin describing the principal of operation and fields of use of apparatus to be used where oxygen content is below the minimum necessary or where atmospheres contain very high concentrations of gases.

Nos. of desired items .....

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FL-1

Air Raids on Industry

[*Continued from page 18*]

doors and windows on ventilation. All influencing factors must be considered in plans for determining the composite of the air from the viewpoint of control of exposure. Also it is not only necessary to determine the range of variations but also to determine simultaneously the period of exposure to each, so that the exposure can be integrated. The ultimate response of the worker depends on his overall daily and possibly yearly exposure.

In the foregoing discussion no attempt has been made to give a listing or description of specific methods. It has been attempted to merely acquaint persons who may have the responsibility of the control of occupational exposure and the maintenance of healthful industrial environment with the general procedures that are followed and the progress that has been made in the development of apparatus and methods for the determination of toxic or destructive materials in the air and meeting of their attacks.

In conclusion, the determination of poisonous constituents in the air requires, primarily, (1) a knowledge of which substance or substances are to be determined, (2) the selection of a method that will give results of the accuracy and character required, and (3) the procurement of samples that represent the condition to be investigated. To these basic items may be added the requirement of an understanding of the hazards of the materials concerned and the purpose for which the information is obtained, before making deductions from tests.

The important facts to be conveyed are that instruments, apparatus, and methods are available for the determination of practically every toxic substance of importance in industrial atmospheres and that enough is known regarding harmful exposures and means for controlling them to markedly reduce if not eliminate in many instances occupational affection from breathing these substances.

●

Two Out of Three

[*Continued from page 22*]

experimentally produced by investigators.

Desensitization has also been experimentally produced to these substances. In factories, we have noted workers who first developed a dermatitis after a few days' exposure to a substance and later on, after they continued the work for a period of time, the dermatitis disappeared and immunity developed and they become "hardened," as they themselves call it.

Among the users of substances processed with chemicals, allergy is the principal cause of dermatitis because substances distributed to the public are harmless to by far the larger percentage of people. As for instance, furs, dyes, cosmetics, etc.

The chief active causes of industrial dermatitis differ in various localities according to the prevailing type of industry. In rural communities, plant poisonings are prevalent, whereas in large manufacturing communities the chemical irritants are the chief causes.

[*Continued in next issue.*]

The Compensation Laws

[*Continued from page 26*]

sation is based upon part-time or full-time wages: for example, a totally disabled skilled worker who was being paid 57 cents per week compensation, under an award based upon part-time earnings, was paid $15 a week under a later award based upon full-time earnings. The wide diversity in benefit provisions in the states has long been deplored by compensation officers. Not only are there extreme variations in the amounts paid, but some states do not pay compensation at all for certain injuries, such as occupational diseases, that are compensated in other states.

The greatest advance in the workmen's compensation system since the first acts were passed has been in the provision for medical aid. The scale of compensation payments fixed by the early acts was very inadequate and has since been much increased, but as to medical aid there was at first no provision whatever in some states.

As of January 1, 1938, 15 jurisdictions provided virtually unlimited medical aid under the law or the administrative practice, as compared with 3 in 1919. To the 15 jurisdictions mentioned there should be added, for most practical purposes, 10 others in which the administering authority may extend, without limit, the provision for medical aid beyond the initial limitation of time or amount specified in the acts. In all the other states having compensation acts, limited medical aid is given. While there are many instances of medical aid that has been meager, cases have been mentioned in which thousands of dollars have been spent upon the care of a worker.

In the states which have fully developed compensation laws, the settlement of claims is tied with a program for preventing accidents and encouraging the rehabilitation of disabled workers. Under such legislation, the program generally includes:

1. Systematic and continuous efforts by responsible authorities, employers, and workers to determine and eliminate causes of accidents.

2. Immediate and adequate medical treatment when injuries occur.

3. Prompt and just payment of compensation benefits.

4. A plan for rehabilitating workers who, because of their injuries, are no longer able to follow their former occupations.

Except in a few jurisdictions, the burden of cost of compensation is placed entirely upon the employer. To some extent, this has helped to make employers "safety conscious." But since the employer's direct and indirect losses from industrial accidents have been estimated to be four times as great as the compensation and medical payments, manifestly the stake of the employer in accident prevention far outruns the financial responsibility covered, customarily, by compensation insurance. Because of the effect of waiting periods and other limitations, it has been estimated that the worker, on the average, does not receive, even in states with liberal benefit provisions, more than 40 per cent net of the wage-loss entailed by injuries. It is apparent that both employer and worker have a large stake in accident prevention.

GLOSSARY OF TERMS

Our use of a certain number of technical and medical terms is unavoidable. Definitions of them will be given, by issues, in this department.

Antibody—Any substance in the blood-serum or other fluids of the body which exerts a specific action on bacteria or other noxa.

Anthrax—Carbuncle, Splenic fever, an infectious disease of animals.

Antigen—Any substance which, when introduced into the animal organism, causes the production of an antibody.

Chlorinated—Containing chlorine.

Cholesterol—A monatomic alcohol occurring in the form of scaly crystals.

Epidermophytosis—Dhobie itch, washer-woman's itch.

Epithelioma—A cancerous growth originating from scaly epithelium.

Epithelium—The purely cellular, nonvascular layer covering all the free surfaces, cutaneous, mucous and serous, including the glands and other structures derived therefrom.

Erysipeloid—A mild dermatitis caused by infection.

Erythema—Redness of the skin; rose-rash.

Erythema multiforme—Hebra's disease, an acute febrile disease with headache and joint pains, accompanied by an eruption of multiform appearance.

Etiology—The doctrine of causes, specifically of the causes of disease; causation.

Folliculitis—An inflammation of any follicles, specifically of the sebaceous follicles.

Impetigo contagiosa—An eruption of flattish vesicles becoming pustules, contagious in character.

Keratosis—Any disease of the epidermis. An individual lesion of this nature, more properly called keratoma.

Lichen planus—An eruption of flattened papules, of a reddish color and shining surface, occurring singly or grouped in patches of varying sizes and shapes.

Morphology—The science which treats of the structure of animals and plants.

Mycosis—Any disease caused by the presence of fungi or bacteria.

Mycotic—Relating to a mycosis.

Naphthalene—Tar camphor, a hydrocarbon obtained from coal-tar and crystallized.

Neuro dermatitis—Inflammation of the skin of nervous origin.

Onycholysis—Loosening or partial shedding of the nails.

Papillomata—(pl.) A circumscribed overgrowth of the papillae of a cutaneous or mucous surface.

Papule—A small elevation on the skin, containing no fluid; pimple.

Paronychia—Felon; inflammation of the structures of a finger or toe.

PH—Abbreviation for hydrogen ion concentration.

Pityriasis—A dermatosis marked by branny peeling or scaling.

Pityriasis rosea—An eruption of patches of varying size, of a pink color covered with whitish scales.

Sebaceous—Pertaining to, or secreting fat; resembling fat.

Seborrhea—Over-action of the sebaceous glands.

Tinea cruris—Ringworm of the inner side of the thighs and the perineal region.

Tinea versicolor—Eichstedt's disease, a chronic eruption of brownish yellow, branny patches on the skin of the trunk, due to the presence of a fungus.

Trichophytosis—Ringworm.

Trichophytin—An extract of cultures of several species of ringworm fungus, used in the diagnosis and treatment of the different varieties of ringworm.

Verruca—Wart, a small, hard excrescence on the skin.

Vesicles—A small elevation on the skin, containing fluid. A small sac containing liquid or gas.

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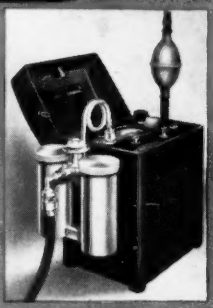

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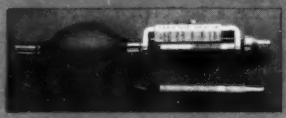

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